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INVESTIGATION OF THE AGRICULTURAL RESOURCES IN  
SRI LANKA 29040

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## I. INTRODUCTION.

During the period July, 1976 to April, 1977, as many as LANDSAT Frames were obtained - mainly due to (a) a selection of all suitable LANDSAT scenes of Sri Lanka at the EROS Data Centre by one member of the team through a routine computer search and secondly through the scanning of all likely cassettes through the fast-search viewers, at the EROS Data Center, (b) placing a Standing Request with EROS Data Center for regular despatch of good quality B/W positive transparencies of 1:1,000,000 scale.

As a result of this we were able to obtain full coverage of Sri Lanka through an assemblage of scenes taken at different times. Coverage of certain parts (N-W and Southern Sections) are still poor due to cloud cover.

However, we have been able to add our data base, many useful LANDSAT scenes and to prepare photo-mosaics of Sri Lanka showing the best combinations of LANDSAT cover in each band.

The cost of the scenes obtained from the EROS Data Center were settled through funds from another project.

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II. DESCRIPTION OF EXPERIMENTS CONDUCTED.

(Experiment numbering continued from the  
last report).

Experiment No.8General Interpretation of a LANDSAT Frame over Colombo.PURPOSE:

The main purpose of this task was to gather experience and knowledge in the use of Landsat pictures with the ultimate objective of obtaining Land Use information. In the first instance, striking features and Land Use patterns, that were discernible, in the Landsat image were studied. The area of study was primarily confined to that extent of land falling within the Southern half of the Landsat image frame ID No:E-2339-04151 of 27th December 1975.

DATA:

Original Data - Bulk MSS 70 mm negative and positive transparencies.

To commence with, Positive, Black-and-White tone-matched enlargements of Landsat Image - ID No: E-2339-04151, Bands 4, 5 and 7 printed on Double Weight Semi-matt Aviphot paper were issued on the approximate scale of 1:500,000 (1 inch to 8 miles).

PROCESSING OF DATA:

The respective exposure and development times used in the visual tone-matching of the step wedges were (vide description of Experiment No.3 for tone-matching procedure):

Band 4- 90 seconds and 60 seconds

Band 5- 45 seconds and 60 seconds

Band 7- 90 seconds and 60 seconds.

The frame covers an area of land (about 35% of the frame) along the West Coast of Sri-Lanka, between approximate latitudes of N.008-00 (Puttalam Lagoon) and N.006-30 (Pentota River).

In addition, the following documents were obtained to assist in a better understanding of the Image.

1. Land Use Maps (Maps of 1" to 1 mile scale - 1956)  
of Negombo, Gampaha, Colombo, Avissawella,  
Panadura and Horana.
2. Latest aerial photographic coverage of the  
study area, 1:25,000 scale.

GENERAL REMARKS:

From the Bulk 70 mm negatives, enlargements at different scales were utilised to facilitate the interpretation.

2. At a casual glance it was observed that Band 7 showed all the water bodies and major rivers very clearly.

3. Band 5 looked generally darker in tone than Band 4. Variations in tone, from black to white indicating perhaps Landform/ Soil conditions or Land Use practices were observed in these Bands. The coastline and the white/dark grey-toned lagoons and lakes, stretched at regular intervals, along the coastline from the very North of the Frame (Puttalam Lagoon) to the water body at the northern edge (Negombo Lagoon) of the S-E quadrant, were all clearly seen to the unaided eye.

BAND 7:

On a closer study of this Band, using a Hand Lens, it was observed that other than the dark toned water bodies and rivers, grey tones of varying densities could be differentiated and traced out from the white background of the image. These took the pattern of paddy tracts that compared well with some of the tracts seen on the Land Use Sheets and Aerial Photographs. In the low-lying areas, as seen around the North and Central regions of the S-E quadrant, and between the coastline and the highland zone, the marshy areas, bare-land/ grassland (perhaps due to flooding) having almost the same grey tone. Thus, differentiating the paddies from the marsh and flooded lands (all of them having a similar tonal density) would be a definite problem in Band 7. Interpretation of sequential imagery at different times of the season is most likely to resolve this difficulty. Interpretation of composites (such as Color Composites on Diazo transparencies) will definitely assist the interpretation.

As far as structural Geology goes, the direction of ridges (anticlines and synclines), trend lines and perhaps even joints and faults appear to be quite visible in this Band. A visual interpretation of the structural geology was attempted and an overlay prepared. The overlay was blown, almost twice, to a scale of 1 inch to 4 miles (approx: 1:250,000) using the pantophot - and superimposed on the Geology Map of the Kelani-Aruvi area (contained in Volume I of the Kelani-Aruvi Area report published by the Hunting Survey Corporation, Canada). There was close agreement between the two. The shadows thrown by ridges, have more or less the same tonal grade as the paddy tracts and hence could be considered as an added constraint in identifying paddies.

#### BAND 5:

On a closer study of Band 5 it was observed that there were variations of tonal grades between the dark tone of water bodies and the white tone of bare land.

There were seen areas of dark tones almost similar in tone to that of water bodies in the south central region of the N-E quadrant and very distinctly in an easterly direction off the centre of the S-E quadrant, at the bottom of the hilly area - These on comparison with aerial photographs (73/6 Nos. 29, 72 and 75 and 73/7 No.30) were identified as Forested areas. These dark patches could either be scrubland, jungle or forest of the Wet Zone of Sri Lanka. The Labugama and Kalatuwawa reservoirs which are enveloped in the same dark patch seen in the S-E quadrant, referred to above, are not discernible perhaps due to the similarity in tonal densities of both water bodies and forested areas. (Band 7 shows these water bodies clearly).

Most of the water bodies seen along the coastline, from the one at the very North of the frame to the one at the Northern edge of the S-E quadrant (Negombo) appear to have a white/dark grey tone whereas the water body (Beira Lake within Colombo City) and the water body approximately 20 miles South of Colombo appear dark. This wide tonal contrast between surface water features cannot be explained at this stage. It was however observed by superimposing a tracing prepared from Band 7, showing the lagoons and lakes, over Band 5 that the extent of the lagoons and lakes



were much more than what appeared to be white/dark grey toned in Band 5. The eastern edge of the Northern-most lagoon (Puttalam Lagoon) and the northern section of the water body (Mundel Lake) just south of it have a dark tone similar to that of the water body in the Colombo City whereas the rest of its surface has a white/grey tone. Could tonal variations of the same water body be accounted to its salt content (salinity) in different sections of it? Could this tonal variation be due to some sub-surface condition? Variations in depth of water at different points could be a plausible answer or could it be that all of these reasons together cause this tonal variation? A study of a composite image is likely to give better answers.

The water body at the centre of the S-E Quadrant (visible in Band 7) was not quite visible on this Band unlike the water body just south of it. Why? Perhaps the former which has a homestead garden and coconut plantation (dark toned vegetation) background to cope with got lost in it whereas the latter situated in a marsh and paddy background, which has a light grey tone, stood-out clearly. Or it could be that this water body was deeper than the former. As suggested earlier, could brackishness and fresh water be a criteria? The time of the imagery being 0415 GMT (approximately 0945 hours Sri-Lanka time) it would be difficult to imagine that the tide action of the sea would have had much of an effect on this.

The Bandaranaike International Airport was clearly visible, positioned in a North-easterly direction almost adjoining the Negombo Lagoon (located at the Northern edge of the S.E-quadrant) - the white areas along side the air-strip are buildings and acres of bareland (Aerial Photo 72/8 No.119). The roadway from the airport to Colombo City was visible too. A few miles of roadway leading Northwards from the airport was somewhat clear and so was part of the roadway leading to the hill-country from the south-eastern periphery of the city of Colombo.

The Ratmalana Air-strip was not clearly visible. It was hidden within the pattern of activity (at the centre of the S-E Quadrant), south of the City. The light grey toned areas (built-up areas) form the bulk of this township (Ratmalana) whereas the clear white areas could be ticked off as the Railway Workshop and a more recently built housing scheme. The strip of light grey tone east of this pattern was in reality a tract of paddy and the white blob north of its southern extremity coincides with the location of the omnibus workshop at Werahera.

The Colombo City area was discernible in a muffled sort of light grey tone and texture. Within, and in close proximity of it, were soon clear white square shaped areas. From a 42X enlargement of the city area, these white patches were picked on to a tracing paper and blown to an approximate scale of 1:25,000. This tracing was super-imposed on a lay-out of the city prepared from 1:25,000 aerial photography. The marked areas were identified as the Bandaranaike Memorial International Conference Hall, Kolonnawa Oil Installations, Narahenpita Flats, Sapugaskanda Oil Refinery etc. In general, these white patches embody (i) Newly built-up areas, (ii) Open Land/Grasslands (Golf Links) or (iii) a conglomeration of large roof-topped buildings and the surrounding bare land (Flats/Factories etc.).

The prominent white pattern east of the City and west of the hill country - in the Kelani river basin - conforms very well with the pattern seen around this same area in Band 7. Its prominence could be due to the availability of shallow water in the paddy tracts. Band 7 gives an indication, by its dark tone, that at this moment there is more water available, in the Kelani River than in any of the others, within this LANDSAT frame. This could then very well be the reason for the flooded tracts in this basin alone and its resulting prominence. This type of pattern exists in the other river basins as well but in a very subdued tone. Perhaps they could be traced out more easily from an Image taken at a time when the paddy tracts are flooded or at the period of sowing seed.

The study area covered by the Land Use Sheets (1956) were compared with the most recent aerial photography available -1972 and 1973 - and the Land Use sheets revised. Following this, the major cultivations

6.  
indicated on the revised Land Use sheets were high-lighted.

These were compared with the LANDSAT Images. On the LANDSAT image the low-lying area east of the Bandaranaike International Airport appeared to be of a dark grey tone similar to that stretch of land situated between the coastline and the water body located a short distance south of the Ratmalana township (almost at the centre of the S-E quadrant). According to the Land Use sheets these areas were predominantly Homestead Garden and pockets of Coconut. Next was considered the basin area of the river falling on to the Negombo Lagoon. The areas to the North and South of this basin have the identical Land Use pattern (of homestead garden). But on the LANDSAT image there was a distinct tonal difference. Why? Could it be due to some soil condition? According to the map showing the approximate distribution of the Great Soil Groups (1 inch to 8 miles) the soils in the area under question are classified as Red Yellow Podzolic soils, with alluviums in the river valleys.

The south central area of the N-E quadrant was mainly coconut just as much as the north-eastern area of the S-E quadrant was rubber. There was an apparent tonal difference between the two practices but how definite was it? Could not the tonal difference be due to other reasons as Landform/Soils etc., and not Land Use? Unless the tonal difference was very striking and obvious as forest (dark tone) and paddy (light grey tone), it may not be possible to visually interpret these Land Use patterns, in single band images.

The cirro-cumulus clouds aligned in a north-easterly direction, seen in the top half of the N-E quadrant, clearly indicated a northeasterly wind action during this period.

#### BAND 4:

Band 4 though somewhat similar to Band 5 was of a lighter tone, and hazy, as expected. The same cultural features, as observed in Band 5 could be identified here. There appears to be a very marked tonal difference between the hilly terrain and the low-lying areas - this was not very apparent in Band 5. The dark grey tone covering almost the entire south western section of the N-E quadrant was very striking. Could this again be a reflection of the soil condition or landform of the area? Or was it the vegetation?



In this Band the near shore-line shows a distinct variation in tonal grades along its coast from about Colombo to more than the half way mark in the 1st quadrant. Could this tonal variation be due to depth as in the case of lagoons and lakes ? (Aerial Photo.72/8 Nos.2 & 74).

As a matter of interest it may be mentioned that in Band 5, the parcel of land adjoining the water body located east of Mundel Lake (top of the N-E quadrant) and along the north-south centre line of the N-E quadrant has a light dark grey tone. The land use covering this area - according to the land use sheets - is predominantly paddy. This was quite in contrast to the tone of the other paddies in this Band. Why ? Could it be that the land use has been changed ? This has not been verified on ground. This is on the boundary of the Dry Zone and the season of cultivation could be different - perhaps another cash crop has been cultivated.

#### SUMMARY :

From Band 7 could be extracted all water bodies and the major river courses. Marshy areas and even water logged areas could be identified. Directions of ridges, trend lines and perhaps joints and faults could be traced.

Band 5 pin-points the newly built-up areas, factory sites, and key features as the Harbour, Airport, Oil Refinery etc. Townships and Cities could be identified to a certain degree of accuracy. Paddy tracts (either flooded or during the period of sowing), forested areas and developed land would be the Land Use patterns that could be traced.

Band 4 appears to give an indication of the near shore depth.



Experiment No.9.Photo-Lab Processing of LANDSAT Imagery for Interpretation.

It was decided to do an enlargement to the scale of 1:253,440 from the 70mm. bulk transparency image of the Central Hills area for the above purpose. With the available Enlarger-cum-Rectifiers ( S E G V and Wild E4 ) maximum possible enlargement out of 70 mm. transparencies was only to the 1:500,000 scale (max.enlargement factor is 7 X).

Hence, it was decided as an intermediate step to prepare a 3 times enlargement out of 70 mm. positive on to a 7" x 7" glass diapositive plate. Then use that glass negative for printing the required 1:253,440 positive prints on paper.

This glass negative is kept in between the two glass plates of the negative carrier. Size of the carrier was 10"x10", whereas the size of the glass negative was 7"x7". Due to this reason there was a possibility of unwanted light entering the printing paper. It was avoided by masking the balance area of the negative carrier by black paper.

Band 7 imagery was enlarged to the required scale by matching with the 1:253,440 scale motor map of Sri Lanka. In order to get a good contrast print, different grades of photographic papers were tested. These tests revealed that Gevaert B 4 113 photographic paper gave the best reproduction for interpretation. It was exposed for 90 seconds and developed for 90 seconds.

Tone matching was achieved by visual inspection of the step wedge of the respective bands by making small alterations in the exposure time. This resulted in a very satisfactory enhancement of the detail in each band for interpretation.

Subsequently, we received film positives on a scale of 1:1,000,000. These positives were used for printing negative paper prints on the scale of 1:253,440. These film positives were really meant for preparation of color composites using Diazo film and Cibachrome. They are also used directly in 'sandwich' form for interpretation on a light table using optical viewing devices.

#### Experiment No. 10.

#### General Interpretation of a LANDSAT frame over Central Sri Lanka

##### DATA:

Positive Black and White enlargements of Bands 5 and 7 of LANDSAT Imagery ID No.E 2482-04055 of 18th May 1976, on an approximate scale of 1:250,000 were made available for the study. This frame covers the area of Central Sri Lanka, and in extent, of about half the area of Sri Lanka. Unlike any of the other frames taken up for study earlier this frame was practically devoid of cloud cover and was found to be suitable for study purposes.

About 50% of this area is covered by the latest aerial photography (1971 to 1975) on the scale of 1:25,000. Wherever possible these were used for comparison purposes.

In addition, the one inch topographic maps as well as the land use maps were utilized in this study.

##### INTERPRETATION:

##### BAND 7.

1. A very distinct feature observed in this Band was the absence of river courses in the eastern section of the frame. The only rivers that could be seen were the (i) Mahaweli, originating in the Central Hills

and flowing in a northerly direction through the centre of the frame, (ii) the Kelani Ganga, originating in the hills and flowing in a westerly direction through the fracture zone, (iii) the Kalu Ganga, originating in the hills and flowing in a south westerly direction and (iv) the Walawe Ganga, seen very faintly, originating in the hills and winding its way in a southerly direction. The invisibility of the other rivers could well be indicative of the prevailing dryness in the rest of the area. The rainfall in the hills average about 20 inches in the month of May which apparently is the reason for the availability of water in the river courses originating in the Central Hills and its visibility in the Imagery.

2. Water bodies (Tanks, Reservoirs and Wewas) are very distinctly seen. The water surface area of some of these appear to have diminished signifying a loss in water capacity. The prevailing dryness in the area could account for this loss (Rukam Tank).

3. The Structure and Drainage pattern within this frame is clearly discernible. The identification of Fault and fracture zones do not seem to be a tedious task. Inselbergs (Erosional remnants) in the eastern half of the frame and the steep rocky areas in the south central regions could easily be interpreted.

4. As for soils, the Alluviums, White/Light-Grey tone, especially alongside the river courses in the eastern section of the frame could be easily demarcated.

5. Very distinct tonal differences are observed between the White/Light-Grey central hill country- spreading out in a north easterly and north westerly direction and the balance Grey/Dark-Grey tone covering the South western, south eastern and northern section of the frame. This tonal difference could most probably be an effect of the underlying soil conditions or vegetation (forested, rubber, coconut and the wet zone homestead garden being dark toned whilst the tea, open land,

and land under development appear in a light tone. The landform - high relief (Mountains, Ridge and Valley, Hill and Valley, Escarpments, Ridges) and low relief (Flood Plains, Valley bottoms) could also play a vital role in tonal variations.

6. The dark toned bodies north of the Uda Walawe Reservoir (seen at the bottom centre of the frame) may be identified as water bodies because they have the same tone as the reservoir itself. On comparison with Band 5 it could be interpreted as paddy tracts/water logged areas (shallow). However, having checked with Aerial photos.72/13 Nos.73 and 74, these dark toned areas were interpreted as definite paddy tracts. Similarly, in the pocket formed by the Mahaweli Ganga - Parakrama Samudra and Minneriya Tank (located at the north of the frame) are observed a number of dark toned patches. These too on comparison with Band 5 could be interpreted as developed land/paddy tracts/water logged (shallow) areas. Yet, on comparison with the Polonnaruwa one inch Topographical Map these were very positively identified as paddy tracts. All the same some of these paddies seen on the Topographical sheet could not be identified on the imagery. Why? Perhaps the content of water in the tracts plays a significant role in its visibility on the imagery. The Poya (Full Moon) falls on the 13th of May and hence the tracts would have been in the process of preparation for the sowing of seed as seed is generally sown after the Full Moon. The paddy tracts fed by Parakrama Samudra appear to have a little water and could be interpreted as tracts that are being attended to for the sowing of seed if not already done. The tracts fed by Minneriya could not be in this same condition - perhaps there is not sufficient water in the tank to feed the tracts.

7. Due to the prevailing dry conditions in the area, marshy land do not appear dark toned but instead have a tone similar to that of open land and grasslands.



BAND 5:

1. Unlike in the earlier frames this image shows a minimum of cloud cover. The clouds appear to be mainly over the S.W. corner of the frame. Could this be an inference for dry weather in the rest of the area? Rainfall during the month of May has an average of about 20 inches in the South West Quarter and a value as low as 02 inches in the eastern section. Peak Wilderness (the southern edge of the hill country area) has a maximum of about 30 inches in May.
2. The forested areas (dark toned) could easily be demarcated. The balance areas of varying tones comprise of developed areas - Paddy, Tea, Rubber, Coconut, Homestead Garden as well as Bare Land/ Grassland. There appears to be a grey tonal variation that could be distinguished - may be not very precisely - from the dark toned rubber to the lighter toned (perhaps a semi-tone lighter) coconut and the greyish-white tea areas. This being a visual study, eliciting tones is too much of an exercise for the unaided eye and hence could not be much depended on for accuracy.
3. The Buttala - Kataragama Road (located in the south east quarter) proceeding through the forested areas could be very clearly seen. However, the trunk road (Wellawaya - Hambantota) which runs almost parallel to it and not so very far from it could not be identified due to the light grey tone of development in which this road is enveloped. Sections of the Colombo - Kandy Road (proceeding in an East-West direction) as well as part of the Rail Track could be identified.
4. Some of the lower sections of dry stream beds (interpreted as Dry due to their non-visibility in Band 7 ) located in the Eastern and South-Eastern Sections of the frame are seen. They are apparently visible due to the dark toned forest background through which they meander.

5. It was observed that the region immediately West of Senanayake Samudra (the large four-pronged water body seen in the East) was of a light grey tone - this could be interpreted as Developed Land/Grassland. At the same time this same area in Band 7 has a Grey tone similar to that of the Forest covered areas observed in the South East and North Central regions of the frame. This tonal effect could well be due to Soil/Landform characteristics. Areas of relatively low altitude seem to have the same tonal grade.

No recent aerial photo coverage of this area is available to verify the development aspect of the area.

The Autograph A.7 was used to try out plotting using individual Bands and using combinations of superimposed Bands. The combinations were achieved by inserting the two different images on the A7 carriers. The report on the trials are as follows : -

Enlarged prints (of Bulk LANDSAT 70 mm. positive and negative transparencies) on glass plate of 9"x9" standard size were used for this experiment.

The principal distance used in all cases was 150 mm. while the base setting varied from 143 mm. (Approx.) to 150 mm. (Approx.) to accomodate the scale, due to positioning on the plate carrier.

#### Orientation.

Super-imposition of Bands:- Different bands were used on the left and right projectors. The superimposition of the projections was achieved keeping the left projector at zero setting and giving K, O, W, by, and bz adjustment to the right projector. The superimposition in all cases were satisfactory.

Scale : - Scaling was done using 2 well identified points along the western coast. The base sheet used for the scaling was 8 miles to an inch (Motor Map).

Results: - Case I: Band 7 positive in left projector  
and Band 5 positive in right projector.

Band +7:- All water boundaries were very clear on this band. It was possible to plot the sea coast boundaries, rivers, water tanks, streams and other water features. No other details were clear enough to plot on this band.

Band+5:- The main roads and some other details such as B.I.A. (Bandaranayake International Airport) were seen on this band. Two main roads Colombo - Negombo and part of Colombo-Galle Road were plotted from this band. The B.I.A. was also plotted. The internal roads were not quite clear and only the main roads in this area could be plotted.

Case II: Band 4 positive in the left carrier and 5 positive in right carrier.

Combined bands of +4 and +5.

Western sea coast boundary and some prominent white patches were plotted. With the help of 4 miles to an inch map some white patches were identified as water tanks. Interpretation of separate bands were not carried out.

Case III: Band +4 positive in left carrier and band 4 negative in right carrier. The combined superimposed image was not clear due to the contrast in the positive and negative used. Only the sea boundary could be positively identified.

Case IV: Band 7 positive in left carrier and band 7 negative in right carrier.

The difficulty experienced is much the same as the Case III.

Case V: Combined bands of -4 and -5.

The sea boundary, water features, cultivation area are visible. But, since negatives were used, the visible features are in the reverse sense. This is a disadvantage for interpretation.



Case VI: Band +7 in left projector and +4 in right projector.

Band 7 : - All water bodies were very clearly visible. It was possible to plot sea coast boundary, water tanks and streams. No other details were enough to plot from this band.

Band 4 : - The visible features were - fields, some roads, collection of buildings and western sea coast boundary. Very clear, visible details such as fields, main roads and western sea coast boundary were plotted.

Conclusion: It was found that superimposed images of two positive or two negatives in different bands did not obscure the clarity of the image but did not have any clear advantage over viewing the separate images independently. As for superimposition of contrasting images (+ve and -ve) this did obscure clarity of the image.

#### Experiment No.12.

##### Use of identical band images in each picture carrier

Band +7 in left projector and +7 right projector.

Machine settings and orientation were similar to previous cases.

The superimposed image gave a greater intensity, making viewing comfortable. However, no new features were identifiable.

##### Attempts at Accurate Scaling.

The first set up tried out was with Band 4 positive in left carrier and Band 5 positive in the right carrier. The diapositives were three times (approx.) enlargement of the original LANDSAT 70 mm. Bulk transparency. The superimposition was achieved with the base separation and using orientation elements (K, O, W, by and bz). The superimposition was satisfactory.

The base sheet used was a quarter inch map. Four well defined points were selected along the Western coast and in the mainland at the N.E. and S.E. positions of the image. Scaling was done between the point at S.W and the N.E. point. When the N.W. point along the coast was checked appreciable discrepancy was observed. Correction to this was attempted using the common tilts Phi and Omega. No improvement was observed.

As a second attempt the positive print on Band 7 was used only on the left carrier. Scaling was attempted as in the previous case. The results confirm that accurate scaling over the entire area was not possible. There was a doubt as to whether the diapositive had undergone deformation at the stage of printing. Hence a second diapositive of the same scale printed with Rectifier settings at zero was tried in the same manner. The results of this attempt too showed that it was not possible to match the scale over the entire image, to the accuracy of the 1:506,880 scale map.

Before arriving at this conclusion, the contact printed diapositive of the Trincomalee Image on Band 7 was used on the A7 left carrier. Scaling attempted confirmed the earlier result that uniform agreement over the entire image was not possible. However localised agreement of the LANDSAT image plot can be easily achieved, though the entire frame cannot be made to fit the base.

### III. ACCOMPLISHMENTS.

1. With the availability of more LANDSAT Frames of good quality, covering a major part of Sri Lanka, the data base has been expanded.
2. All available LANDSAT Scenes have been indexed.
3. Reference copies have been placed in the Photo Library Browse File from which all sales of photographic products are ordered by the public or by user organisations.
4. Enlargements (B/W Photo-maps) to the scale of 1:253,440 have been made for comparison with the map base of the same scale and for revision of base maps.
5. Evaluation and analysis of all the available data is completed. Quick look reports have been prepared.

### IV. SIGNIFICANT RESULTS.

1. The analysis phase is continuing. We have experienced difficulty in proper interpretation and analysis due to the fact that we have been so far restricted to single band B/W enlargements. We had no facilities for preparation of color composites. This aspect has now been looked into under a separate project and we have now developed the facilities to prepare color composites of excellent quality in our own laboratory, using bulk B/W 70 mm transparencies or from 1:1,000,000 positive transparencies. These color composites are studied through optical devices on light tables. We have also added a Zoom Transfer Scope to our facilities enabling direct transfer of LANDSAT Composite data on to our base maps.

2. In addition to this, we have developed our own capability to Computer-process LANDSAT CCT's using a general-purpose small capacity computer for processing and analysis of LANDSAT data.

Complete reports on the results of investigations carried out under this separate project is being submitted, in due course.

With the development of such in-house capabilities it will be possible to rapidly revise the existing Land Use Maps so that up-to-date information is available. This is especially possible in areas covered by large homogeneous land use practises. Multi-temporal coverage is most useful in the case of seasonal crops such as rice.

The cost of these investigations and future applications are expected to be minimal, so long as LANDSAT Data continues to be made available on such collaborative projects/investigations as this - viz: 29040, Investigation of Agricultural Resources of Sri Lanka.

V. PUBLICATIONS:

Nil

VI. PROBLEMS:

Vide our remarks at IV, Paragraphs 1 and 2.

In addition to these the problem of non-availability of concurrent aerial photographic cover of test-areas continues to exist. We plan to solve this soon by repairing our Aircraft for aerial photography.



## VII. DATA QUALITY AND DELIVERY.

The quality and resolution of the imagery is very good for identifying medium size homogeneous areas. Coverage has not been systematic perhaps due to cloud-cover.

## VIII. RECOMMENDATIONS.

It is recommended that this investigation be continued. Every possible effort is being made to make our aerial survey aircraft operational - in order to provide fast "ground truth" data in critical sample areas. It is also recommended that further improvements to our facilities be considered on such collaborative efforts

It is opportune, at this stage, to form an inter-disciplinary team to undertake the systematic and continuing generation of thematic data extraction and presentation. It is also recommended that such activities be monitored by an authoritative body which may be named, e.g., "Remote Sensing and Survey Applications Board". This body could co-ordinate all such activities, lay down priorities and keep Government informed of resources applications and may even sponsor collaborative efforts with other Overseas Organisations. These proposals are being given serious consideration by the Sri Lanka authorities.

**IX. CONCLUSIONS.**

LANDSAT Data when properly processed can be used for monitoring the Agricultural Resources of Sri Lanka especially in the larger development areas which yield the major amount of food production. In these areas, the concept of crop-yield estimation (if not prediction) may be developed. The successful use of such information is likely to yield positive benefits for the welfare of the community.